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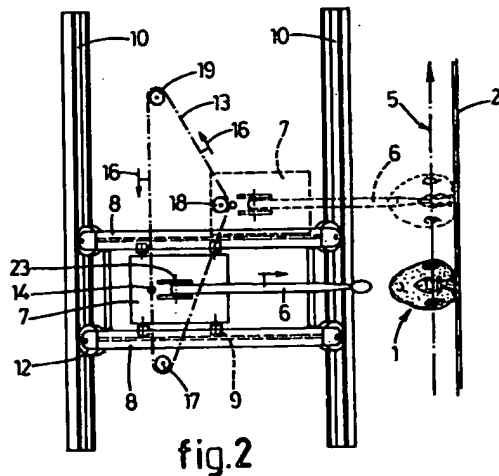
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⑤④ Method and apparatus for eviscerating poultry.

⑤⑦ According to the invention a method and apparatus is provided in which an eviscerating means (6) is moved into and out of poultry (1) to be processed. The spine of the poultry extends horizontally and transversally to the direction of conveying the poultry. During evisceration the eviscerating means reciprocates horizontally in the direction of the poultry and moves synchronously with the poultry in the direction of conveying.



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EP 0 574 617 A1

The invention relates to a method for eviscerating poultry which with its legs is suspended from a suspension conveyor, wherein an eviscerating means is moved into and out of the poultry.

In a known method of this type the eviscerating means is entered into a bird to be processed in downward direction. During a following upwardly directed motion the entrails and alike are removed from within the bird. In view of enabling a veterinary inspection of the entrails these at first remain attached to the bird and are pending downwardly over the back of the bird.

Although this known method is extremely fit per se for eviscerating poultry its application may, under some circumstances, cause problems. While eviscerating turkeys for example it is disadvantageous that the entrails are pending downwards over the back of the bird, for this may contravene local conditions in respect of hygienics.

It is an object of the invention to provide a method of the type referred to above, which resolves this disadvantage in a simple, but nevertheless effective way.

Thus the method according to the invention is characterized in that the poultry is manoeuvred in such a position, that the spine of the poultry extends substantially horizontally and transversally to the direction of conveying and wherein the eviscerating means is moved into and out of the poultry substantially horizontally, whereas said eviscerating means is further moved in the conveying direction of the conveyor synchronously with the poultry.

The position taken in by the poultry during the method according to the invention assures, that entrails removed from within the poultry is pending down freely from the bird while still being attached thereto and, thus, cannot lead to a contamination of the outside of the bird.

In a preferred embodiment of the method according to the invention the poultry is suspended from the suspension conveyor with its neck too. As a result one may easily assure that the poultry is in the desired position in which the spine extends substantially horizontally.

The invention further relates to an apparatus for carrying out the method according to the invention, wherein the poultry with its legs and its neck is suspended from a suspension conveyor, which apparatus is characterized by a driving assembly positioned adjacent to said suspension conveyor for moving the eviscerating means into and out of the poultry and for moving the eviscerating means in the conveying direction synchronously with the poultry while eviscerating.

Preferably the driving assembly comprises a carriage supporting the eviscerating means and which is displaceable in a horizontal plane. By

virtue of such a carriage the required motion of the eviscerating means can be realised in a controlled way.

In this respect it is preferred, that the carriage is reciprocable along a first rectilinear guiding which itself is reciprocable along a second rectilinear guiding perpendicularly to the reciprocation of the carriage. Such a combination of two rectilinear guidings leads in a simple, but nevertheless reliable way to the realisation of two degrees of freedom, such that the carriage is freely movable in a horizontal plane.

For being able to drive the carriage according to a further embodiment of the apparatus according to the invention it is preferred, that below the rectilinear guidings a driving means is provided engaging the carriage and following an endless track. The driving means may comprise an endless chain, belt, girdle or alike to which a dog is attached engaging the carriage. The track followed by the endless chain and the dog attached thereto thus defines the track of the carriage and thus of the eviscerating means attached to the carriage.

For realising an effective motion of the eviscerating means it is handy, if the chain, belt, girdle or alike, as seen in the conveying direction, firstly follows a slanting first track section for moving the eviscerating means into the poultry, next follows an oppositely slanting second track section for moving the eviscerating means out of the poultry and finally follows a returning track section for returning the eviscerating means towards its starting position. When the dog of the endless chain follows the slanting first track section the carriage (and the eviscerating means) has the same velocity as the poultry in the conveying direction of the suspension conveyor; however the carriage (and the eviscerating means) too comprises a motion component perpendicularly to the conveying direction in the direction of the poultry for entering the eviscerating means into the poultry. During the following oppositely slanting second track section the velocities of the poultry and the carriage with eviscerating means (seen in the conveying direction of the conveyor) still are identical, whereas however the eviscerating means now is moved out of the poultry. Finally in the returning track section, the carriage with eviscerating means is returned to the starting position oppositely to the conveying direction of the conveyor, in which starting position the eviscerating means is distanced far enough from the poultry for passing it.

Further it is advantageous, if the carriage carries a number of juxtaposed eviscerating means which simultaneously engage different birds. As a result the apparatus according to the invention can process a larger number of birds in the same time.

Finally an embodiment of the apparatus according to the invention is mentioned in which the eviscerating means is supported by the carriage so as to be vertically pivotable. In this respect it is possible, that a device, preferably a cylinder-piston assembly, is positioned between the eviscerating means and the carriage biasing the eviscerating means downwardly. Like this it is possible to adapt the position of the eviscerating means in view of the dimensions of a bird to be processed. In the case of a large bird the force exerted on the eviscerating means by the biasing device can be set on a high level, such that the eviscerating means strongly presses upon the spine of the bird. If however a small bird has to be processed the force may be set on a lower level.

Although previously always an eviscerating means has been mentioned, it is indicated that instead of such an eviscerating means other processing means may be applied too, without stepping out of the scope of invention. In this respect a cloaca cutter or a intestine suction device may be mentioned.

Hereinafter the invention will be elucidated referring to the drawing in which two embodiments of an apparatus for carrying out the method according to the invention are illustrated.

Fig. 1 shows in a side elevational view an embodiment of an apparatus according to the invention;

fig. 2 shows the apparatus of fig. 1 in a top plan view, and

fig. 3 shows schematically the operation of a second embodiment of the apparatus according to the invention.

The apparatus illustrated in fig. 1 is meant for processing poultry 1, which with its legs 2 and its neck 3 is suspended from carrying hooks 4 of a suspension conveyor 5 known per se. The carrying hooks 4 are shaped such, that the spine of the poultry 1 extends substantially horizontally and transversally to the conveying direction of the suspension conveyor 5 (in fig. 1 perpendicularly to the plane of the drawing).

It is noted here, that although the invention is illustrated referring to an apparatus in which the poultry is suspended with its legs and its neck from the carrying hooks of the suspension conveyor, it is possible too to provide other means for ensuring that the spine of the poultry extends horizontally. In this respect one can imagine guiding means extending below the suspension conveyor, which guide the initially downwardly pending neck of the poultry upwardly during its passage, thus positioning the poultry horizontally as required.

Adjacent to the suspension conveyor 5 a driving assembly is positioned for moving the eviscerating means 6 into and out of the poultry 1.

Further referring to fig. 2 it appears, that the driving assembly comprises a carriage 7 carrying the eviscerating means 6. The carriage 7 is reciprocatably transversally to the conveying direction of the suspension conveyor 5 (in fig. 2 indicated by a dashed and dotted line) and along a first rectilinear guiding 8. For this the carriage 7 might for example comprise wheels 9.

On its turn the first rectilinear guiding 8 comprises a carriage, which is reciprocatably perpendicularly to the reciprocation of the carriage 7 (so in parallel to the conveying direction of the suspension conveyor 5) and along a second, stationary rectilinear guiding 10 which rests on the ground with feet 11. The carriage-shaped first rectilinear guiding 8 comprises wheels 12.

Below the rectilinear guidings 8 and 10 a driving means is provided engaging the carriage 7. This driving means, in the illustrated embodiment shaped as an endless belt 13, follows the endless track indicated in fig. 2 by a dashed and dotted line that is defined by guiding rolls 17-19. A dog 14 is attached to the belt 13 and engages the carriage 7. The belt 13 is driven by a motor 15. Instead of a belt 13 an endless chain, girdle or alike may be applied too.

When belt 13 is driven by the motor 15 in the direction indicated by arrows 16 the dog 14 will offer to the carriage 7 a corresponding motion along the rectilinear guidings 8 and 10.

The track followed by the carriage 7 will now be elucidated further referring to the guiding rolls 17 until 19 defining the track of the belt 13. When the dog 14 follows the track section extending between the guiding rolls 17 and 18 the carriage 7 is displaced in the conveying direction of the suspension conveyor 5 as well as perpendicularly thereto. The velocity with which the belt 13 is driven is such, that the velocity component of the carriage 7 in parallel with the conveying direction of the suspension conveyor 5 equals the conveying velocity of said suspension conveyor 5. Like this the eviscerating means 6 so to say "keeps in touch" with the poultry conveyed by the suspension conveyor 5. The velocity component of the carriage 7 perpendicularly to the conveying direction of the suspension conveyor 5 sees to it, that the eviscerating means 6 is moved towards the poultry 1 to be processed, as is indicated in fig. 2 starting from the position of the carriage 7 shown in full lines towards the position of the carriage 7 illustrated in dotted lines. In said latter dotted position the eviscerating means 6 has entered the poultry after which the eviscerating operation may occur.

The factual eviscerating operation occurs when the dog 14 of the belt 13 follows the track section between the guiding roll 18 and the guiding roll 19.

While following this track section it is again so, that the velocity component of the carriage 7 in parallel with the conveying direction of the suspension conveyor 5 equals the conveying velocity of said suspension conveyor. Further however the carriage 7 has a velocity component perpendicularly thereto, such that the carriage 7 and the eviscerating means 6 are removed from the poultry 1. As a result of latter velocity component the eviscerating means 6 (in a way known per se) can realise the eviscerating operation.

From the foregoing it appears, that the carriage 7 and eviscerating means 6 attached thereto "keep in touch" with the poultry 1 to be processed while following the track sections between the guiding rolls 17 and 18 or 18 and 19, respectively. After passing guiding roll 19 the carriage 7 with eviscerating means 6 is returned to its starting position oppositely to the conveying direction of the suspension conveyor 5, whereafter again a processing in accordance with the above may occur.

Contrary to what has been said previously the track followed by the belt 13 may have different shapes. A different shape may be defined by another type of process that has to be carried out on the poultry. By way of example a track is mentioned, in which after the slanting track section, extending between the guiding rolls 17 and 18, a track section is provided extending in parallel with the track of the suspension conveyor 5, ahead of the slanting track section corresponding with the section between the guiding rolls 18 and 19. It is only essentially that in these track sections the component of the velocity of the carriage in parallel with the conveying direction of the suspension conveyor 5 equals the conveying velocity of said suspension conveyor 5. It is possible that the belt 13, when the dog 14 follows the returning track section between the guiding rolls 19 and 17, is driven at a higher speed than during the remaining track sections, such that the carriage 7 and the eviscerating means 6 are returned to the starting position more rapidly. Especially when the carriage 7 carries only one eviscerating means 6 this can lead to a substantial time saving. However, in fig. 3 an alternative embodiment is shown in which the belt 13 continuously has a constant velocity, but in which the processing of the poultry to be processed happens in an optimal way.

Fig. 3 indicates schematically, that the carriage 7 carries a number (in this special case eight) of eviscerating means 6. While following the track section between the guiding rolls 17 and 18 these eviscerating means 6 are introduced in a corresponding number of birds 1 (from the position shown in fig. 3a to the position shown in fig. 3b). Next, while following the track section between the guiding rolls 18 and 19, the eviscerating means 6 are, for

their respective processing, removed from the bird 1 (wherein finally the position shown in fig. 3c is obtained). Eventually the carriage 7 with the eviscerating means 6 moves along the turning track section between the guiding rolls 19 and 17 towards the starting position (fig. 3d), whereas the birds 1 are now conveyed by the suspension conveyor that far, that the eviscerating means 6 can engage a next number of eight birds 1' for carrying out a next operation.

In the embodiment of the apparatus shown in fig. 3 the respective eviscerating means 6 simultaneously process a corresponding number of juxtaposed birds suspending from the suspension conveyor. Like this the capacity of the apparatus may be increased considerably.

Further it is indicated in fig. 1 that a device, for example a cylinder-piston assembly 20, is positioned between the eviscerating means 6 and the carriage 7 biasing the eviscerating means 6 downwardly. By virtue of this cylinder-piston assembly 20 the force with which the eviscerating means engages the bird to be processed can be set. Such a setting may be advantageous when birds having different dimensions have to be processed. In view of being able to provide such a biasing device the eviscerating means 6 is pivotably attached to the carriage through a pivot axis mounted on the carriage 7.

Further fig. 1 and fig. 2 illustrate, that at the side of the bird facing away from the driving assembly aside of the suspension conveyor 5 an abutment plate 21 is provided which has to prevent the birds 1 from moving aside when the eviscerating means 6 engage the birds.

Although previously always an eviscerating means has been mentioned it is noted, that different kinds of processing means may be applied too without stepping out of the scope of the invention. Instead of an eviscerating means one can think of a suction tube for sucking empty the intestines or a cloaca cutter for cutting loose the cloaca of the poultry to be processed. In any event it is essential that, irrespective of the operation, material removed out of the bird, such as entrails or intestines, while still being connected with the poultry, depends downward free from the back of the poultry (indicated by the package 22 represented in dotted lines in fig. 1), such that undesired contaminations are effectively avoided.

For carrying out the method according to the invention it is essential, that the spine of the birds extends substantially transversally to the conveying direction of the suspension conveyor. In this context it is possible to apply carrying hooks 4 enabling a rotation of the poultry around the axis of the carrying hooks, such that the spine may be rotated from a position, in which it extends into the

conveying direction, towards a position in which it extends perpendicularly to said conveying direction.

The invention is not limited to the embodiments described previously, which may be varied widely within the scope of the invention.

Claims

1. Method for eviscerating poultry which with its legs is suspended from a suspension conveyor, wherein an eviscerating means is moved into and out of the poultry, **characterized** in that the poultry (1) is manoeuvred in such a position, that the spine of the poultry extends substantially horizontally and transversally to the direction of conveying and wherein the eviscerating means (6) is moved into and out of the poultry substantially horizontally, whereas said eviscerating means is further moved in the conveying direction of the conveyor (5) synchronously with the poultry.
2. Method according to claim 1, **characterized** in that the poultry is suspended from the suspension conveyor with its neck too.
3. Apparatus for carrying out the method according to claim 2, wherein the poultry with its legs and its neck is suspended from a suspension conveyor, **characterized** by a driving assembly positioned adjacent to said suspension conveyor (5) for moving the eviscerating means (6) into and out of the poultry (1) and for moving the eviscerating means in the conveying direction synchronously with the poultry while eviscerating.
4. Apparatus according to claim 3, **characterized** in that the driving assembly comprises a carriage (7) supporting the eviscerating means (6) and which is displaceable in a horizontal plane.
5. Apparatus according to claim 4, **characterized** in that the carriage (7) is reciprocable along a first rectilinear guiding (8) which itself is reciprocable along a second rectilinear guiding (10) perpendicularly to the reciprocation of the carriage.
6. Apparatus according to claim 5, **characterized** in that below the rectilinear guidings (8, 10) a driving means (13) is provided engaging the carriage (7) and following an endless track.
7. Apparatus according to claim 6, **characterized** in that the driving means (13) comprises

an endless chain, belt, girdle or alike to which a dog (14) is attached engaging the carriage (7).

8. Apparatus according to claim 7, **characterized** in that the chain, belt, girdle or alike, as seen in the conveying direction, firstly follows a slanting first track section for moving the eviscerating means into the poultry (1), next follows an oppositely slanting second track section for moving the eviscerating means out of the poultry and finally follows a returning track section for returning the eviscerating means (6) towards its starting position.
9. Apparatus according to one of the claims 4-8, **characterized** in that the carriage carries a number of juxtaposed eviscerating means (6) which simultaneously engage different birds (1).
10. Apparatus according to one of the claims 4-9, **characterized** in that the eviscerating means (16) is supported by the carriage (7) so as to be vertically pivotable.
11. Apparatus according to claim 10, **characterized** in that a device (20), preferably a cylinder-piston assembly, is positioned between the eviscerating means (6) and the carriage (7) biasing the eviscerating means downwardly.

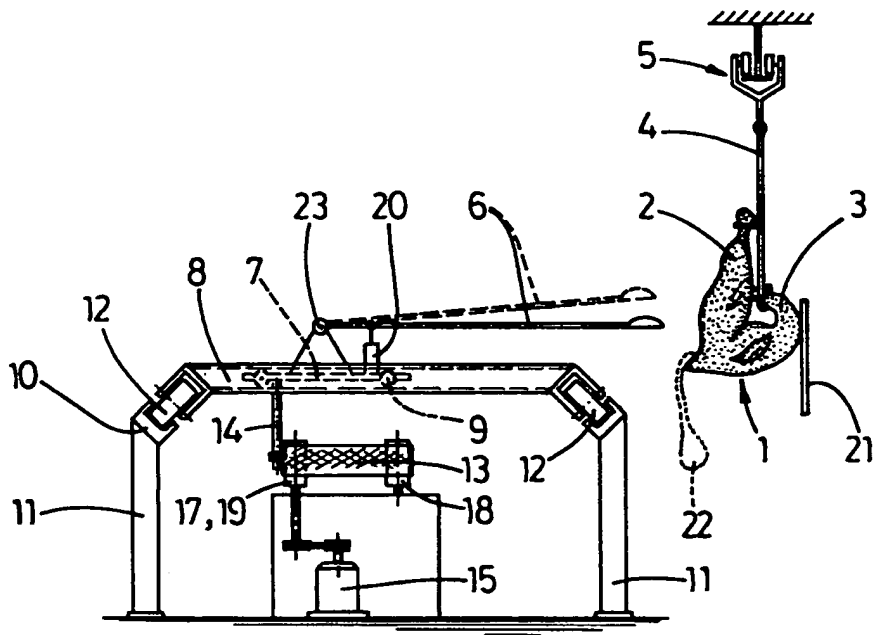


fig.1

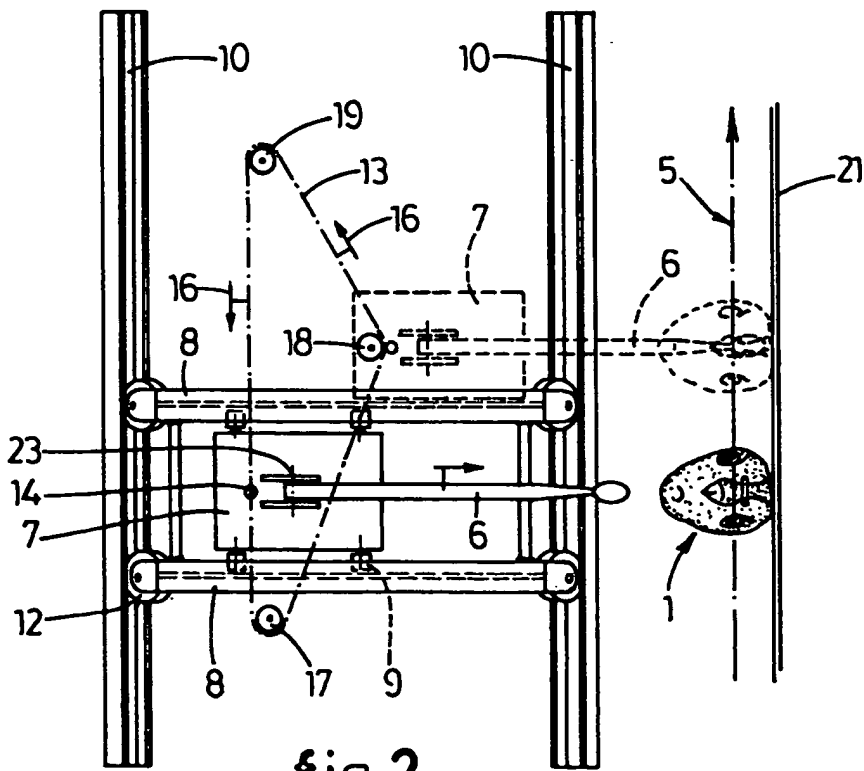


fig.2

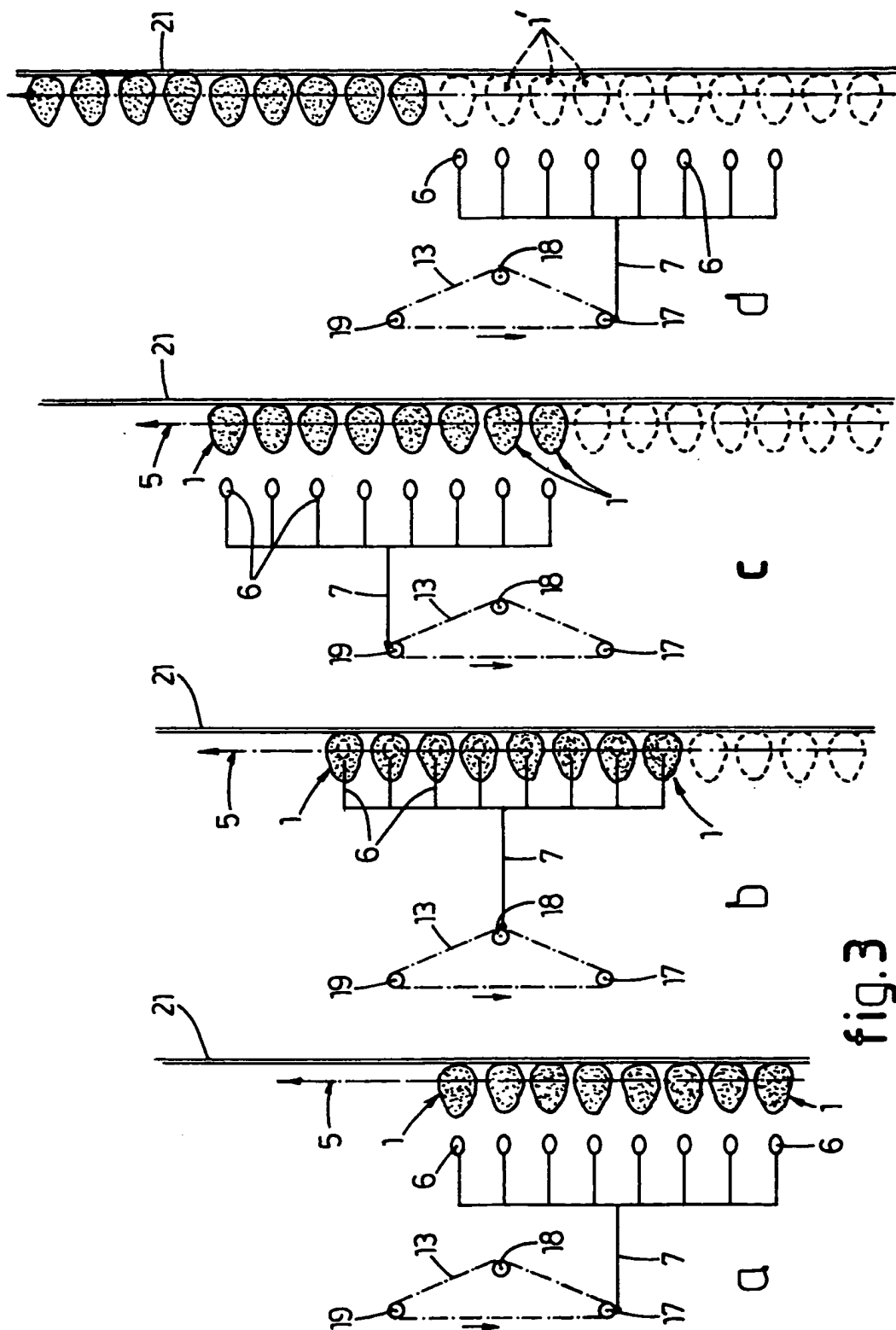


fig.3



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EUROPEAN SEARCH REPORT

Application Number

EP 92 20 1764

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X A	US-A-3 474 492 (VISCOLOSI) * column 3, line 52 - column 5, line 9 *	1-3 4,5,10, 11	A22C21/06
A	GB-A-1 378 411 (COPE WHELON)		
A	NL-A-7 713 912 (LOTH)		
A	NL-A-7 300 546 (GAINESVILLE MACHINE)		
A	US-A-4 677 709 (DIXON)		
A	US-A-4 467 498 (GRAHAM)		
A	NL-C-35 067 (DRAW-TRIM CORPORATION)		
A	US-A-3 510 907 (REJSA)		
A	US-A-3 837 045 (BLACKER)		
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			A22C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 15 JANUARY 1993	Examiner DE LAMEILLIEURE D.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons a : member of the same patent family, corresponding document			